

## Type 2280 Tuning Forks



### Product description

Type 2280 Tuning Forks are suitable for level detection of liquids or granular, powdered solids. Mounted on tanks filling/emptying can be controlled using these devices just as well they can generate fail-safe alarms providing overfill or dry run protection.

The operating principle is based on the electronic circuit exciting the fork probe making it vibrate. As the medium reaches and covers the fork its vibration changes. The electronic device senses changes in vibration and provides an output signal after a specified delay.

### Benefits/features

- Maintenance-free principle of vibration
- Independent of conductivity, permittivity, pressure and temperature
- High pressure
- Selectable sensitivity
- Relay or electronic output
- Temperatures up to 130 degrees
- ATEX and WHG approvals (optional)
- IP67, 65/68 protection



### Applications

- Potable Water
- Cooling Water
- Demineralized Water
- Water/Glycol Solutions
- Chemicals

## Technical data

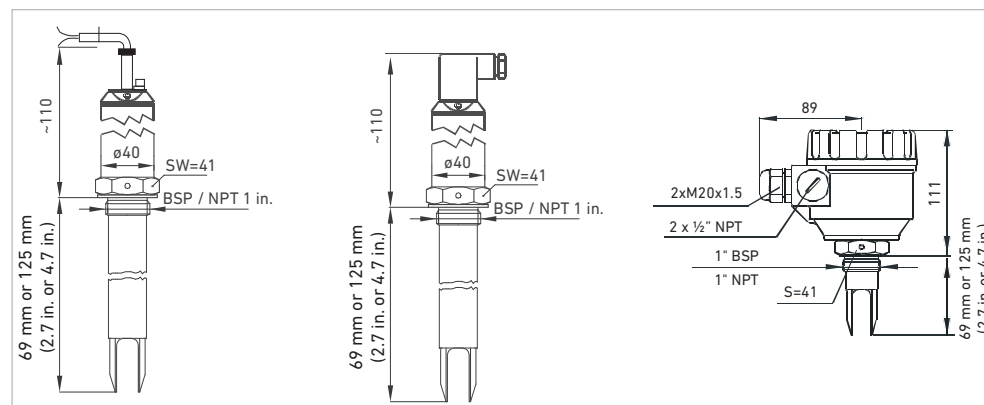
General	2280-S-5xxC-1/-2	2280-S-5xx0-1/-2	2280-S-5xxT-1/-2
Special length	69 mm or 125 mm (2.7 inch or 4.9 inch)		
Indicator light	Bi-color LED		
Environment			
Process temperature	-40 °C ... +130 °C (-40 °F... +266 °F)		
Ambient temperature	-40 °C...+70 °C (-40 °F...+158°F) / -30 °C...+70 °C (-22 °F...+158°F)		
Process pressure (absolute)	4 MPa (40 bar) 580 psi		
Min. medium density	≥ 0.7 kg/dm3		
Max. medium density	≤10'000 mm2/s (cSt)		
Housing			
Sensor	Stainless steel DIN 1.4571		
Housing	Stainless steel DIN 1.4571		PBT
Protection rating	IP67		
Process connection	1 in. BSP / NPT		
Electronics			
Switching function	2-wire AC, 3-wire PNP-NPN		1 SPDT relay
Voltage/current outputs	AC 9mA free, 14 mA immersed 3-wire max. 350mA, <4.5V (on)		250 V AC, 8 A AC1
Power supply	12...55 V DC or 20 ... 255 V AC, 50/60 Hz		20 ... 255 V AC and 20 ... 60 V DC
Reaction time	≤ 0.5 s		
Power consumption	0.6 W		AC: 1.2 ... 17 V A; DC: <3 W
Connection	Cable PVC 5 x 0.5 mm 2, 3 m	DIN plug	Terminal
Protection	Class III		Class I
Standards and Approvals			
ATEX approval (optional)	ATEX II 1 G Ex ia IIC T6, IP68		
General approvals	CE, UKCA, RoHS		

## Dimensions

2280-S-5xxC-1/-2

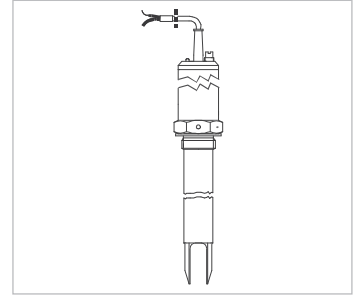
2280-S-5xx0-1/-2

2280-S-5xxT-1/-2



## Ordering Information

Manufacturer's part no.	Part no.	Description
2280-S-5WBO-1	159 300 200	Length 69 mm, Stainless Steel, 3-wire PNP-NPN output, DIN connector, BSP thread
2280-S-5WBC-1	159 300 201	Length 69 mm, Stainless Steel, 3-wire PNP-NPN output, cable, BSP thread
2280-S-5WBO-2	159 300 202	Length 125 mm, Stainless Steel, 3-wire PNP-NPN output, DIN connector, BSP thread
2280-S-5WBC-2	159 300 203	Length 125 mm, Stainless Steel, 3-wire PNP-NPN output, cable, BSP thread
2280-S-5XWBO-1	159 300 210	Length 69 mm, Stainless Steel, 2-wire AC, DIN connector, BSP thread, ATEX
2280-S-5XWBC-1	159 300 211	Length 69 mm, Stainless Steel, 2-wire AC output, cable, BSP thread, ATEX
2280-S-5XWBO-2	159 300 212	Length 125 mm, Stainless Steel, 2-wire AC, DIN connector, BSP thread, ATEX
2280-S-5XWBC-2	159 300 213	Length 125 mm, Stainless Steel, 2-wire AC, cable output, cable, BSP thread, ATEX
2280-S-5WNO-1	159 300 220	Length 69 mm, Stainless Steel, 3-wire PNP-NPN output, DIN connector, NPT thread
2280-S-5WNC-1	159 300 221	Length 69 mm, Stainless Steel, 3-wire PNP-NPN output, cable, NPT thread
2280-S-5WNO-2	159 300 222	Length 125 mm, Stainless Steel, 3-wire PNP-NPN output, DIN connector, NPT thread
2280-S-5WNC-2	159 300 223	Length 125 mm, Stainless Steel, 3-wire PNP-NPN output, cable, NPT thread
2280-S-5XWNO-1	159 300 230	Length 69 mm, Stainless Steel, 2-wire AC output, DIN connector, NPT thread, ATEX
2280-S-5XWNC-1	159 300 231	Length 69 mm, Stainless Steel, 2-wire AC output, cable, NPT thread, ATEX
2280-S-5XWNO-2	159 300 232	Length 125 mm, Stainless Steel, 2-wire AC output, DIN connector, NPT thread, ATEX
2280-S-5XWNC-2	159 300 233	Length 125 mm, Stainless Steel, 2-wire AC output, cable, NPT thread, ATEX
2280-S-5WBT-1	159 300 240	Length 69 mm, Stainless Steel, PBT housing, 1 SPDT relay, BSP thread
2280-S-5WBT-1	159 300 241	Length 125 mm, Stainless Steel, PBT housing, 1 SPDT relay, BSP thread
2280-S-5WBT-2	159 300 242	Length 69 mm, Stainless Steel, PBT housing, 1 SPDT relay, NPT thread
2280-S-5WBT-2	159 300 243	Length 125 mm, Stainless Steel, PBT housing, 1 SPDT relay, NPT thread



## Technical basics

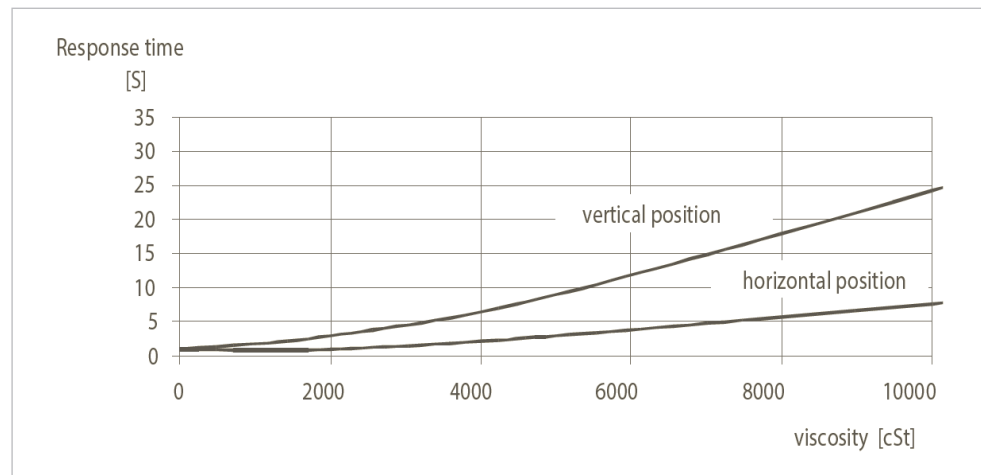
Since this concerns an invasive measuring principle, the composition of the medium to be measured plays an important role with regard to the functionality of the 2280 Tuning Forks.

First check whether the medium is resistant to the sensor housing. The sensor housing consists of stainless steel DIN 1.4571, 316.

Furthermore, the viscosity determines whether the measuring principle can be used. Especially if it is assumed that the liquid repeatedly comes into contact with the switch without it being cleaned in the interim.

Media with a maximum viscosity of 10,000 mm<sup>2</sup>/s (cSt) can be detected reliably. Liquids with higher values overwhelm the self-cleaning function of the fork. There is a risk that the switch will no longer be able to discern a change in frequency. It remains in the switched state, even though the fill level has already fallen.

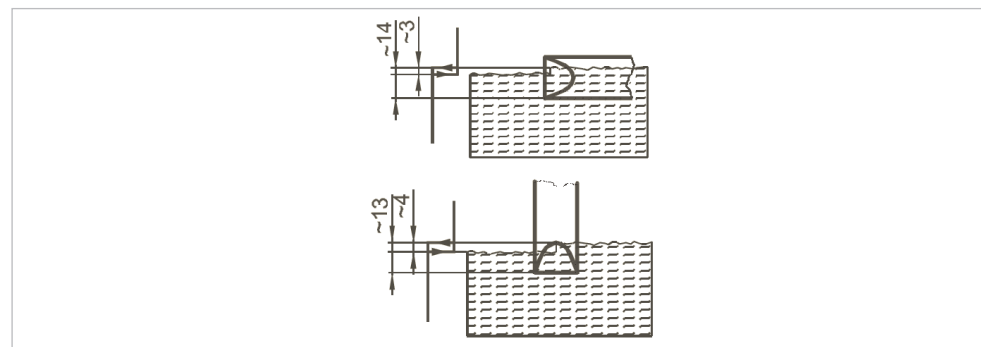
Depending on the viscosity, there is a certain time delay before the fork becomes free.



Reaction time / viscosity

### Switching point

The following graphic illustrates the switching point on the fork. This point also depends on the density of the contact liquid.



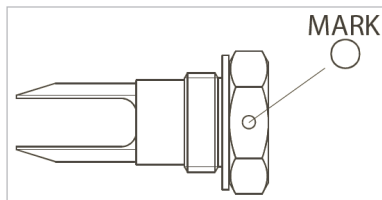
Switching points: values in mm with water 25 °C

## Handling

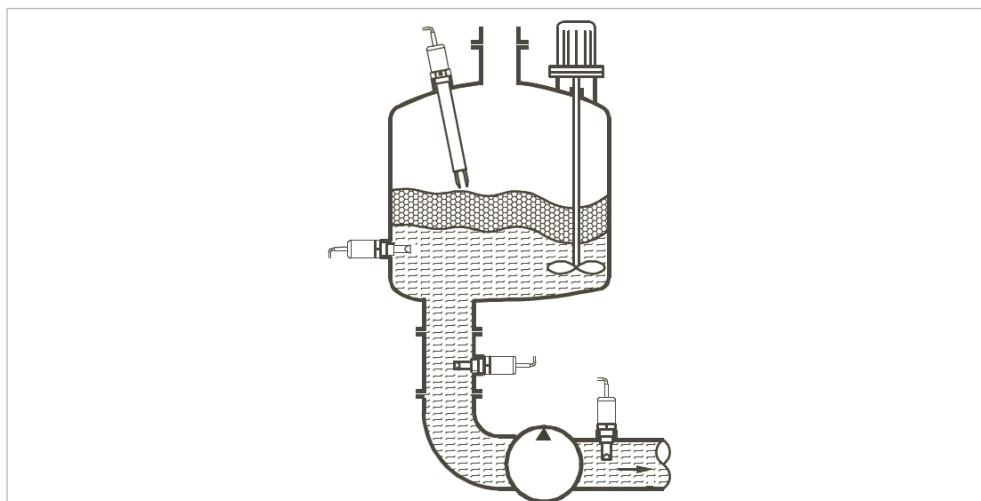
### Installation notes

#### Position

In order to attain the best possible measuring performance, the 2280 Tuning Forks can be installed in different ways. Here, marking the side on the hexagon helps. With PTFE tape on the thread, the required end position can be reached. If no particular position is necessary, installation of the standard sealing ring is sufficient.

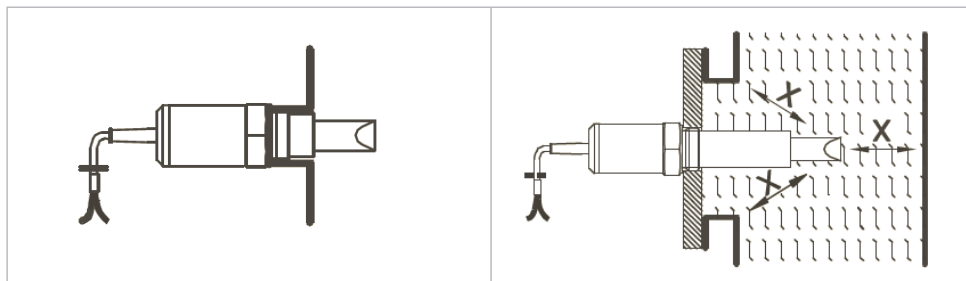


- **Low viscosity**
  - No particular position is to be maintained here. The sensor can be installed in any desired position.
- **High viscosity**
  - Install the sensor vertically, if possible. This can substantially improve the reaction time after submersion.



Examples of installation positions of the 2280

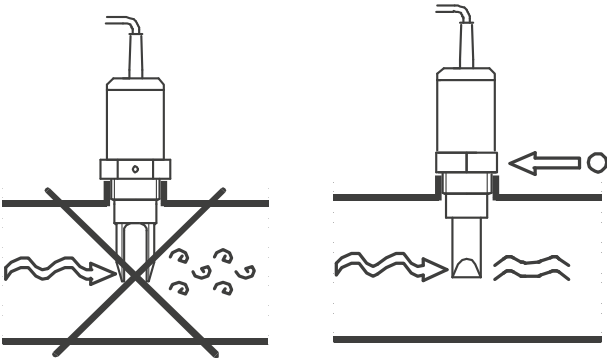
Additionally, it must be ensured that there is sufficient free space around the sensor, in order to prevent deposits. This is particularly true for installations in pipes. The fork must also be able to be completely immersed in the medium.



Caution when assembling fittings and pipes with small dimensions.

Special note on installations in pipes

When installing into pipes it must be ensured that the fork of the 2280 is aligned parallel to the flow. This is necessary in order to prevent deposits and to achieve the best possible reaction time. The mark on the hexagon will help with orientation.



Function test with test magnet

Each 2280 can be checked for proper function as soon as there is power. This requires a magnet (RPS-101). If the test magnet is placed on the marked spot on the housing, the switching state of the 2280 changes.


Function diagram

Overview of the various switching states and LED displays

Voltage	Tuning Forks	Operating mode	LED	Output	
On	Covered	HIGH	Red	OFF	
		LOW	Green	ON	
	Open	HIGH	Green		
		LOW	Red	OFF	
Failure	Open or covered	HIGH or LOW	Off		

Maintenance notes

The 2280 Tuning Forks are rugged sensors for industrial applications. Therefore, in general no maintenance is necessary. In certain cases it may become necessary to clean residues from the Tuning Forks at regular intervals. Heavy soiling can cause the 2280 Tuning Forks to no longer reliably change switching states.

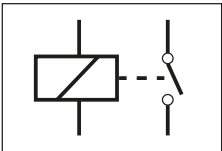
 Installation and maintenance must be performed according to the corresponding installation instructions. The installation manual is included with the product, see also the online product catalog at [www.gfps.com](http://www.gfps.com)

Tips on use

Overfill protection

It is recommended that a level switch also be installed for every continuous measuring system (hydrostatic or ultrasonic). Particularly in order to be able to reliably detect the highest allowed level.

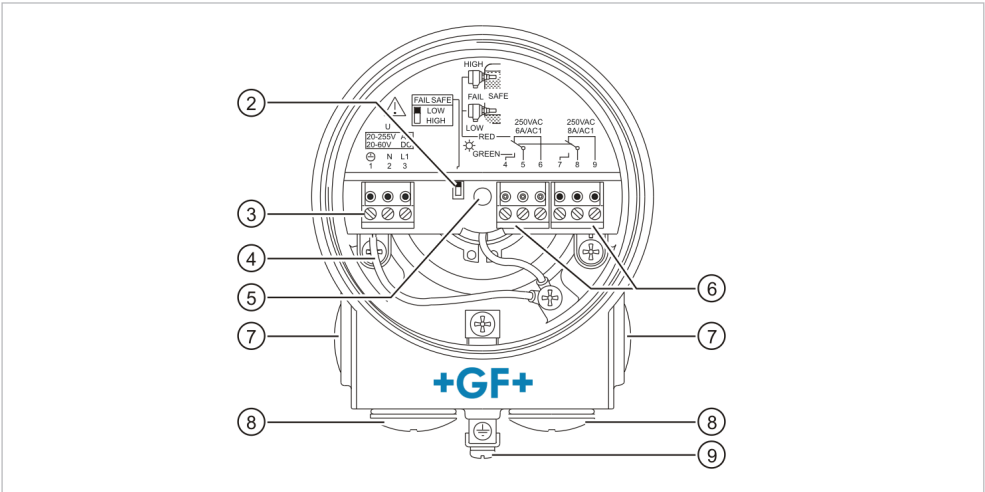
Placed correctly, the 2280 provides a HIGH alarm for this purpose, and can be directly connected to a stop relay in order to stop the feed pump in an emergency.



GF level switches in connection with a stop relay offer a simple, redundant safety concept in case the continuous system fails.

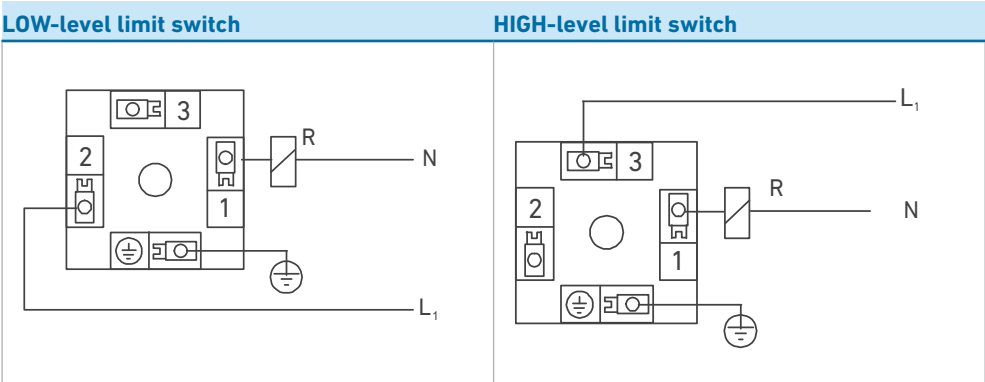
Wiring

PBT Enclosure Version

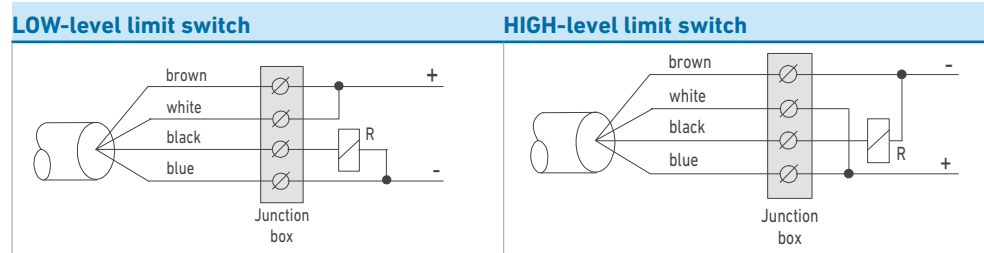


- 1 n.a.
- 2 Fail safe mode
- 3 Mains
- 4 Grounding
- 5 Status LED
- 6 Output
- 7 1/2" NPT
- 8 M20 x 1.5
- 9 Grounding screw

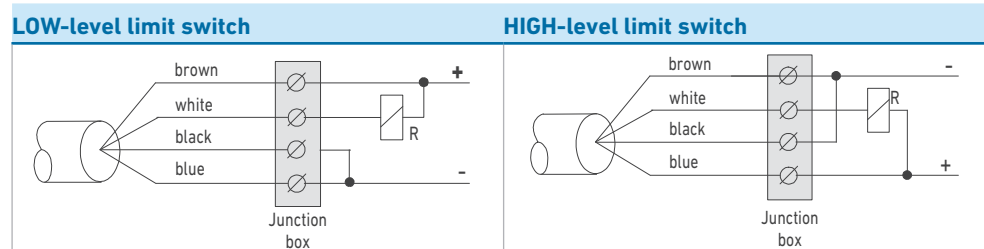
DIN connector and 3 Wire DC version



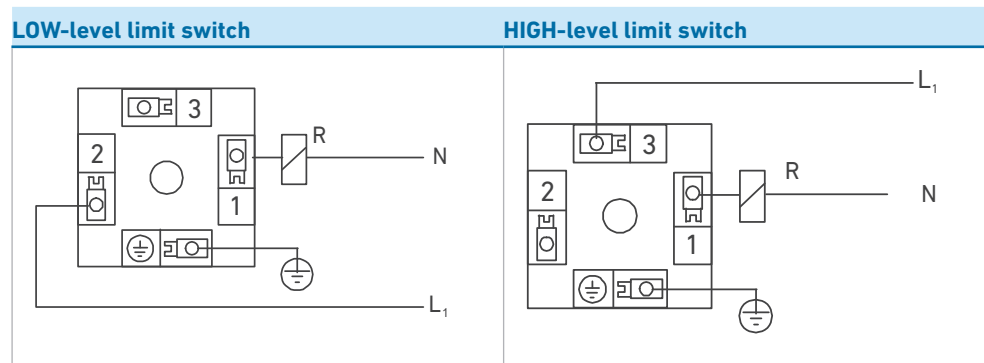
## Version with DC cable, 3 Wire DC, PNP-wiring



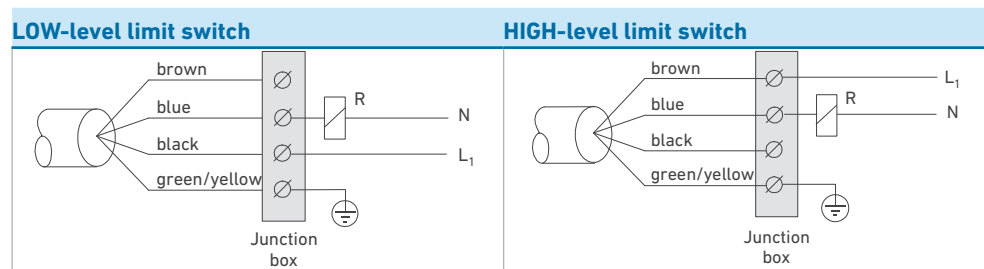
## Version with DC cable, 3 Wire DC, NPN-wiring



## Version with DIN connector and 2-wire AC



## Version with DC cable, 2-wire AC



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Tel. +41 52 631 11 11 • [www.gfps.com](http://www.gfps.com) • E-Mail: [info.ps@georgfischer.com](mailto:info.ps@georgfischer.com)